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UNITED STATES NAVY

MEDICAL NEWS LETTER

Editor - Captain L. B. Marshall, MC, USN (RET)

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TABLE OF CONTENTS

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Policy

The U. S. Navy Medical News Letter is basically an official Medical Department publication inviting the attention of officers of the Medical Department of the Regular Navy and Naval Reserve to timely up-to-date items of official and professional interest relative to medicine, dentistry, and allied sciences. The amount of information used is only that necessary to inform adequately officers of the Medical Department of the existence and source of such information. The items used are neither intended to be nor susceptible to use by any officer as a substitute for any item or article in its original form. All readers of the News Letter are urged to obtain the original of those items of particular interest to the individual.

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Notice

Due to the critical shortage of medical officers, the Chief, Bureau of Medicine and Surgery, has recommended, and the Chief of Naval Personnel has concurred, that Reserve medical officers now on active duty who desire to submit requests for extension of their active duty for a period of three months or more will be given favorable consideration.

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Residency Training Policy for Reserve Medical Officers on Active Duty

The response by Reserve medical officers to the Residency Training Program for Reserve officers, as provided in BuMed Instruction 1520.7, has been most gratifying. There are several vacancies remaining in the following residency programs: Pathology, Orthopedic Surgery, Obstetrics and Gynecology, Pediatrics, and Urology. A very limited number of billets are still available in Otolaryngology, Anesthesiology, and Ophthalmology. While applications for training in the above specialties should be for one year at a time, it is expected that in most instances officers who participate in this program will be permitted to complete their required training without interruption. Every effort will be made to accomplish this insofar as service needs will permit.

Reserve medical officers on active or inactive duty, who have completed their obligated active duty imposed by the Universal Military Training and Service Act, as amended, are eligible for participation in this program. Reserve officers on inactive duty must request return to active duty in order to be assigned to such training.

SPECIAL NOTICE

TO ALL ADDRESSEES (EXCEPT U.S. Navy and Naval Reserve personnel on ACTIVE DUTY and U.S. Navy Ships and Stations).

Existing regulations require that all Bureau and office mailing lists be checked and circularized at least once each year in order to eliminate erroneous and duplicate mailings.

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Editor

(Detach here)

Chief, Bureau of Medicine and Surgery _____
Navy Department, Potomac Annex (date)
Washington 25, D.C.

I wish to continue to receive the U.S. Navy Medical News Letter.

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Eligible and interested medical officers should make applications to the Bureau of Medicine and Surgery, via the chain of command. Letters of application should contain an agreement to volunteer for the period of residency training requested and to remain on active duty in the Navy for a period of one year following completion of training, for each year of training received.

From time to time the list of medical specialties in which shortages exist will be published in the Medical News Letter. (ProfDiv, BuMed)

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Cataract

The general practitioner should have some knowledge of cataracts because the eye is part of the human body, and the development of lens opacities may be the only sign of some general dysfunction. He would thus be alerted to the necessity for investigation and correction of the condition.

Patients who are faced with the threat of loss of vision or who have found it reduced to less than adequate for their vocation, usually develop considerable emotional stress. The probability of their being unable to earn a livelihood is quite serious. Their anxiety and apprehension may well get out of bounds. They need guidance. In desperation or through poor advice, they may fall into the hands of unscrupulous physicians or quacks.

The general practitioner should know the basic facts, the early signs and symptoms of cataract, because he may be the first to discover the lens changes, or to infer that his patient has cataracts. He should know that it is no longer necessary to wait for the cataract to "ripen" before the operation for restoration of vision. The surgical technique of extraction has advanced so that it is possible and good to remove the cataract in the immature stage.

Various nonsurgical forms of treatment have been tried. Unfortunately, there is no specific cure for cataract. Instillation of various irritating and congesting medications; lens protein therapy (and this includes fish lens protein); massage; subconjunctival and retrobulbar injection of mercury and other irritating substances; nonspecific foreign protein therapy including foreign tissue, placental extract, glutathione, and certain amino acids; vitamin therapy including vitamins A, B, and C--all have been tried. Under the light of proper scientific investigation they have been found wanting in proof of specific value.

The only rational nonsurgical program for treatment of cataract is based on the very careful medical survey. This can best be done by the

general physician. He should try to find the cause and then use measures directed at any positive pathologic findings. When none are discoverable, then a general program of building up the patient's physical condition should help retard, and even to prevent, the progress of the cataract. The general practitioner will look ahead for all of his patients who consult him, and even before any cataract or other degenerative condition develops, will advise them individually how best to conserve the separate tissues and the body as a whole.

The ophthalmologist may temporarily improve the patient's vision and give aid by instilling drops that dilate the pupil. This should be done only while keeping close check on the intraocular pressure, as the cataract may swell after imbibition of fluid and cause glaucoma. Certain large bulky nuclear cataracts also may push the iris forward and block the area of the eye through which drainage of aqueous humor normally takes place. The changing errors of refraction which accompany the progress of the cataract may be alleviated by modifying the patient's glasses.

Generally speaking, providing there are no complicating factors, the operation for the removal of cataract may be performed when the patient's vision becomes impaired enough to interfere with his way of life and his livelihood.

Many influences may determine the final decision. As in any branch of medical practice, various opinions have been expressed on this matter. It would be best that the general practitioner, in talking with his patient, be a little guarded in his predictions as to what the ophthalmic surgeon will do. There may be an ocular complication such as glaucoma or detachment of the retina, which may need preliminary surgery before the extraction of the cataract. There may be a complicating low grade uveitis that needs treatment and observation for some time before it will be safe to remove the cataract.

The principal indications for cataract extraction are:

1. The need for improvement or restoration of vision.

2. The relief of increased intraocular pressure or inflammation in the cases in which the cataract is responsible in whole or in part for the complication.

3. The need for prevention of complications, such as glaucoma and uveitis, which may be produced by the toxic bodies coming from an overripe cataract. Great difficulties may be averted by removal of a hypermature or subluxated cataract before further loosening of the zonule permits complete dislocation.

4. The need for improving the view of the interior of the eye so that surgery for reattachment of the retina may better be carried out.

5. The need for relief from the cosmetic blemish of an easily noticeable cataract. Occasionally this is done for a young person in whom there is a disfiguring cataract even though there is no thought of improving the patient's vision.

6. Advanced age and even apparent extreme debility are not contra-indications to operation on one eye since this can be done without pain or shock. Good absorbable sutures which need not be removed are used to close incision. Only one eye need be bandaged. The patient can be gotten out of bed at any time in the immediate postoperative period. The trials and tribulations of the elderly are certainly less with vision than without it. Psychoses and other mental disorders arising from arterio-sclerosis will not be cured by restoration of vision, but there are certain anxiety states and disorders of orientation that will be alleviated and even cured by relief of associated blindness.

The principal contraindications to cataract extraction are:

1. Very poor general condition of the patient.
2. Active uveitis.
3. Increased intraocular pressure. In cases of uncompensated glaucoma, the extraction of the cataract must be delayed until control of the pressure is established.
4. Retinal or nerve function so poor that there would be no improvement in vision.
5. Central corneal opacities. Corneal transplant should be done first.
6. Useful vision in the fellow eye (except under special conditions of damage to the eye by toxic products of the cataract and by dislocation).

A cataract may be removed by the extracapsular method, i. e., by opening the capsule and removing the opaque contents. This method is applied to mature cataracts and to the cataracts of very young individuals, in general, to those less than 30 years old.

The intracapsular extraction, or removal of the whole capsule and its contents, now gives wonderful results in the restoration of vision. The technique has been improved until it has nearly reached perfection. It may well be applied to cases of immature cataract. There need be no waiting for ripening and no period of complete blindness. A careful study of both the eyes and the patient must be made preoperatively, and a short period for building up the patient is usually worthwhile.

In cases in which the lens has been removed from only one eye, the two eyes will no longer function together, as the image of the aphakic eye is different in size from that of the unoperated eye. However, there need be no confusion if only one eye is corrected and used at a time. Recently, an attempt has been made to insert in the eye itself, a plastic lens to replace the removed lens. This would have the effect of retaining the optical system of the eye, except that there would be no function of changeable focus or accommodation.

This method would seem to be ideal especially for monocular cases which might retain fusion, but the procedure is still in the experimental stages and has proved harmful in a high percentage of cases. It depends

on the extracapsular technique. The introduction of a foreign body into an eye adds greatly to the possibility of serious complications.

The authors advise that the general practitioner not seek this supposed convenience for his patients at this time, or possibly at any time in the future. The end results of implantation of acrylic or other plastics in the eye is not promising. The hazards are too great. The well-performed conservative operation and the use of light-weight glasses is still by far the best program for restoration. (GP, Oct., 1954; D. B. Kirby, M. D., and E. P. Danforth, M. D., New York City)

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Renal Papillary Necrosis

The scarcity of papers in the urologic literature dealing with renal papillary necrosis has prompted the submission of this report. At the Indiana University Medical Center, 6 cases of renal papillary necrosis have been recognized since 1945; two of the patients survive and 4 are deceased.

Renal papillary necrosis must be suspected in any diabetic with severe acute pyelonephritis, gross hematuria, renal colic, micturition of solid material, or rapidly progressive renal insufficiency not responsive to chemotherapy and diabetic management. The disease may be an acute, fulminating, rapidly fatal process, or it may be relatively chronic and progressive, with or without intermittent or terminal acute, fulminating episodes. Oliguria and anuria may occur. The severity of the diabetes does not seem to be a factor.

Gross hematuria may denote the slough of a papilla. The line of separation between necrotic papilla and viable medullary parenchyma is the site of hemorrhage. Hematuria is often severe, with the passage of vermiform clots. Renal colic indicates obstruction of a major calyx or ureter by sloughed parenchyma or by blood clot. Obstruction may exist to a high degree. The passage of a papilla in the urine is, of course, a dramatic event. This is a rather rare phenomenon, many such masses either being overlooked or undergoing liquefaction necrosis prior to their excretion. Such solid masses that are passed and submitted to the physician are conclusive evidence when examined microscopically.

More difficult of identification are those diabetics whose renal function progressively fails. Many diabetic patients with pyelonephritis in whom papillary necrosis is not found will tend to follow this fatal course. Only an omnipresent awareness of the possibility of such a necrotic reaction will bear diagnostic fruits.

Roentgenographic study must often be utilized. The retrograde pyeloureterogram may be helpful, if not diagnostic. Early changes noted are

those of ragged irregularities reminiscent of renal tuberculosis, usually selective of 1 or 2 minor calyces. Later, separation of the papilla will leave a "ring shadow" in the calyx. A negative filling defect within the pelvis indicates the passage of the papilla into the collecting system. The calyx, deprived of its papilla, displays a clubbed appearance not unlike that seen in hydronephrosis. In this clubbing, however, pelvic dilatation is not found. It should be emphasized that the so-called "ring shadows" and pelvic defects due to loose papillae at pyelography are extremely uncommon. In pyelographic studies more frequently one notes end-results of sloughing. Here typically are seen clubbed minor calyces in the absence of obstruction. Many such patterns are overlooked, simple pyelonephritis being advanced as the diagnosis.

The clinical diagnosis of papillary necrosis in the nondiabetic is an even more difficult problem because of its relative rarity. Only familiarity with the typical roentgenographic picture and careful histologic study of tissue fragments submitted by the patient will lead to the diagnosis. The vast majority of these cases, diabetic or nondiabetic, reach the autopsy table before papillary necrosis is suspected.

Published information on the management of papillary necrosis is scarce. To be sure, infection is the dominant and immediate problem at hand. It must be emphasized that careful bacteriologic studies of the offending organisms are imperative. These should include drug sensitivity tests with all the available antibiotics. Inasmuch as the rapidity of renal destruction is often alarming, potent antibiotic therapy must be brought to bear promptly.

Enhancement of existing renal infection, as well as hydronephrotic destruction of renal parenchyma, must be avoided. Blockage of the drainage channels with sloughed tissue may be a serious problem; ureteral catheter drainage may suffice temporarily. Irrigation of the pelvis and ureter with streptokinase-streptodornase may cause rapid lysis of the sloughed tissue. Surgical intervention for obstruction unrelieved by such conservative methods may conceivably be necessary.

Nephrectomy has been advocated, and may be life-saving. However, careful consideration of medical management, the exclusion of the existence of bilateral disease, and evaluation of total renal function, must precede any decision for extirpation of renal parenchyma. Effective antibiotic therapy may eliminate or postpone nephrectomy. Certainly, nephrectomy is contraindicated if the integrity of the opposite kidney is in question. (J. Urol., Oct., 1954; R. A. Garrett, M. D., M. S. Norris, M. D., and F. Vellios, M. D., Indiana University Medical Center, Indianapolis, Ind.)

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Trauma in Nephroptosis

The question of the etiology of trauma is of great importance as people are wont to attribute their troubles and distress to injury, particularly when there is a question of monetary compensation. Therefore, the attending physician must make a careful evaluation of each case to determine if the ptosis or hydronephrosis in question actually resulted from injury.

Intensive study has revealed the existence of certain mechanical factors which must be present to produce ptosis of the kidney. These include the erect position of man, peculiarity of body form (in which renal fossa containing the kidney varies in shape), lack of muscle tone, diminished intra-abdominal pressure, inherent weakness of the supporting renal and perirenal fascias, et cetera. Trauma may cause descent of the kidney in patients of peculiar body form in whom the renal fossa offers poor support. However, it may occur in people with so-called normal anatomic configuration. Although infrequent, increased weight of the kidney (due to tumor, cystic disease, calculi, or hydronephrosis) has also been given as a cause of movable kidney. In these cases, superimposed infection is often present, and accompanying perinephritis tends to fix the kidney in place, preventing even normal mobility.

Ptosis of the kidney does not necessarily cause symptoms. In descending, the kidney does not always carry the entire ureter down with it, as the ureter may become fastened to the posterior peritoneum 3 to 4 cm. below the ureteropelvic junction. It may become kinked at this point of fixation to the posterior peritoneum, or over an aberrant vessel, or fibrous bands, and impede the outflow of urine causing intermittent hydronephrosis. It is the acute bending or corkscrew formation of the ureter that usually causes the obstruction, resulting in pain due to back pressure, gastrointestinal, and nervous symptoms. In some cases of ptosis, torsion takes place in which the pedicle and ureter are twisted, giving rise to similar symptoms. When aberrant vessels are present, particularly in the upper pole, the pull on these vessels may also cause pain.

The acute traumas are due to blows on the lumbar region, falling on feet or side of body from a height, or sudden depression of the diaphragm. The resulting obstruction precipitates so-called strangulation symptoms. The sudden descent of the kidney causes stretching of the vascular pedicle and supporting ligaments and may be accompanied by contusion or rupture of the kidney and even its blood vessels. This phenomenon of stretching of the vascular pedicle may be observed in delivering the kidney when mobilizing it for operation.

Chronic trauma may be the result of an occupation requiring standing, weight-bearing over long periods of time, repeated flexion of the body, continuous jolting of horseback riding, motorcycle riding, motor trips over

rough roads and excessive strain of coughing or chronic constipation.

Two types of nephroptosis are due to trauma: (1) in patients where trauma may activate latent symptoms in a pre-existing, non-symptomatic movable kidney, and (2) in patients where acute or chronic trauma actually causes descent of the kidney.

The treatment of nephroptosis, and torsion secondary to trauma, is the same as that when trauma is not an etiologic factor.

Much debate has taken place over the criteria for nephropexy. It is clearly indicated in the following examples: patients suffering from classical symptoms (pain, gastrointestinal distress, and nervous phenomena) who are not relieved by conservative measures; patients in whom faulty drainage results from the kidney being anchored in an unusually low position due to perinephritis; obese patients, and those presenting extensive abdominal scars to whom the supportive action of belts is of no avail; patients presenting chronic infected hydronephrosis, secondary to ptosis, in whom stasis favors chronic infection; patients presenting marked torsion as well as ptosis of the kidney in whom symptoms are due to twisting of the ureter and renal pedicle; patients in whom calculus, cyst, et cetera, coexist; surgical replacement of ptotic and non-ptotic kidney upon which other operations are performed. In selected patients, relieved by the supportive belt, permanent cure may be obtained by surgical suspension. This is particularly true of the manual laborer whom the belt prevents from carrying on his work. Some patients prefer operation to wearing cumbersome abdominal supports. Visceroptosis is not a contraindication for operation. (Am. J. Surg., Oct., 1954; C. P. Mathé, M. D., St. Mary's Hospital, San Francisco)

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Permanent Manpower Loss

There are three measures of permanent manpower loss with which the Medical Department is concerned: mortality, invalidings, and separations of recruits due to unsuitability. Invalidings from service include individuals discharged upon recommendation of a medical survey board and those retired or separated for disability through the physical evaluation system. These two procedures require admitting the person to the sicklist. Discharge of recruits found unsuitable for service by the medical department psychiatric units at the training activities are handled by the aptitude boards without admitting the individual to the sicklist and are, therefore, discussed separately.

The total mortality rate in fiscal year 1954 was 2 per 1000, about 20% lower than the rate for the previous year. The decrease was accounted for by the drop in battle casualties following cessation of the Korean conflict

in mid-1953. There were approximately 2200 deaths of which only about 185 were battle casualties.

Deaths from disease and non-battle injuries increased slightly. In May 1954, over 100 officers and enlisted men lost their lives in an unprecedented explosion and fire aboard the USS Bennington. Motor vehicle accidents accounted for approximately 475 deaths, and plane crashes for an estimated 560. Of the latter, 45 were officer candidates and crewmen killed during an NROTC airlift in mid-July.

During fiscal year 1954, there were approximately 18,000 invalidings from service--9300 following medical survey and 8700 through the physical evaluation system. Compared with invalidings of the previous fiscal year, this was about the same number of physical evaluation separations, but medical survey discharges were 20% fewer.

The estimated invalidings rate for fiscal year 1954 was 18 per 1000 average strength. The rate was higher for Marine Corps personnel than for Navy--about 30 per 1000 compared with 14 per 1000.

Navy and Marine Corps discharges from service, following recommendations of Boards of Medical Survey, are of two general types: (1) administrative discharges of members found to be unfit for service by reason of inherent defects which existed prior to entry into the service and which do not constitute physical disability; and (2) disability discharges of members unfit for service by reason of physical disabilities not incurred in, or aggravated by, service. This fiscal year the medical survey discharges were evenly divided between the two types.

Of the approximate 9300 medical survey discharges, about 5000 were of Navy personnel, and 4300 of Marine Corps personnel, Disability was the cause for relatively more of the Marine Corps medical survey discharges than of the Navy discharges--63% compared with 39%. Last year disability discharges accounted for only 53% of the Marine Corps medical survey discharges although the proportion of Navy discharges in this category was 41%, about the same as this year.

Individuals discharged by medical survey boards had been in service relatively short periods of time. One third had less than 3 months of service; slightly over one half had served less than one year; and approximately three fourths were discharged before starting their second year of service. Individuals discharged for disability had much shorter length of service than did those discharged for inherent defects. Of all individuals given medical survey discharges for inherent defects, only 10% had served less than 6 months while nearly 70% had served more than 1 year. In contrast, 70% of those discharged for disability had less than 6 months active service, while 20% had served more than 1 year. Of those serving 8 years or more, all but 1 was for inherent defect. Eligibility for physical evaluation broadens for members in service 8 years or more, and most separations of individuals with that much service are made through

the physical evaluation boards. A similar relationship is noted by age, inherent defects increasing in importance as age increases.

Mental, psychoneurotic, and personality disorders were responsible for 52% of the medical survey discharges. Most of these conditions were inherent defects resulting in administrative discharges. Diseases of the bones and organs of movement, accounting for 13% of the total, ranked second in total frequency and first as a cause for medical survey disability discharges.

The diagnostic cause varied between Navy and Marine Corps. Mental conditions accounted for a far greater proportion of the Navy discharges than of those of Marine Corps personnel, and all of the discharges for motion sickness were Navy personnel. On the other hand, diseases of the eye, ear, nose, and throat, and diseases of the nervous system were more prominent among Marine Corps discharges.

Title IV of the Career Compensation Act of 1949 provides for the evaluation of the physical fitness of military personnel to perform their duties. This Act is administered through the physical evaluation system. The procedure involves appearance of the individual before a clinical board and a physical evaluation board. Following review of the case by the Physical Review Council, final action is taken by the Secretary of the Navy.

Of the physical evaluation separations during fiscal year 1954, 6% were permanently retired; 56% were placed on the temporary retired list; 29% were separated with severance pay; and 9% were discharged without benefits of the Career Compensation Act.

Compared with the distribution of separations by type of disposition for previous fiscal years, this was a relative decrease in permanent retirements. Separations with severance pay remained about the same.

The age and length of service distributions for the individuals separated were about the same as in previous years. Less than 10% of the individuals, separated from service through physical evaluation, had served less than 1 year; a little more than two thirds had served from 1 to 8 years; and just under one fourth had 8 years or more of service.

Length of service, one of the controlling factors in determining disposition, varies by type of disposition. Most of the individuals discharged without compensation had relatively short lengths of service. In comparison, those separated with severance pay had been in service longer, while personnel placed on retirement had been in service longest of all.

Mental conditions were the leading cause for physical evaluation separations, accounting for 23% of the total. Diseases of bones and organs of movement, the second ranking cause, was the primary disability in 16% of the cases. Accidents, violence, and poisonings (injuries) ranked third with 10%.

Type of disposition varies by primary disability at time of retirement. One third of the permanent retirements were due to absence of a

limb or other part of the body. A large part of the temporary retirements, separations with severance pay, and discharges were accounted for by mental conditions and bone diseases. Injuries, also, were important contributors to temporary retirements.

The rate of discharge for unsuitability for service increased among recruits during fiscal year 1954 from 30.7 per 1000 recruits screened in fiscal year 1953, to 39.6 per 1000. Of the 138,791 recruits screened by psychiatric units, 5497 were discharged.

The naval training centers were responsible for the increased discharge rate; the discharge rate at the Marine Corps Recruit Depots decreased. NTC San Diego had the largest percentage increase in discharge rate; the 1954 fiscal year rate was nearly 75% higher than that of the previous year. The Great Lakes and Bainbridge rates were about 50% higher. On the other hand, the rate at MCRD, San Diego was nearly one-third lower, while that for Parris Island was about 5% lower. It is of interest to note that the number of recruits screened at the naval training centers during fiscal year 1954 was about 50% lower than in fiscal year 1953. In contrast, the number of Marine Corps recruits screened increased by about 80%.

The discharge rates for the Naval Training Centers ranged from 42 to 48 per 1000. In contrast, the rate for the MCRD, San Diego was 13 per 1000, the lowest of any of the training activities, while the rate of 54 per 1000 at MCRD, Parris Island was the highest. (Statistics of Navy Medicine, Oct., 1954)

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Paramecia and High Dosage Radiation

In the last two decades there has been a tremendous increase in the number of investigations dealing with the biological effects of X radiations upon organisms. Responsible in large measure, has been the construction of high-intensity generators which produce very penetrating radiations, some of which are of such short wavelengths as to approach the gamma rays of radium.

Most radiation effects are not observed immediately after exposure to ionizing rays. Nevertheless, the ionization and excitation effects so evoked are believed to occur directly in the cells of the organisms during irradiation. This delayed action or time-lapse between irradiation and the appearance of toxic symptoms is called the "latent period." It explains why so many victims of the explosions of two atom bombs over Japan in 1945 did not die until days or weeks after exposure. In the repeated periodic exposure to x-ray over a fairly long time, an explanation exists of the untimely deaths of many pioneer workers in this field who were unaware of the cumulative effects of radiation.

To investigate the latent period as well as the genetic and other biological effects in greater detail, radiobiologists have used a wide variety of plant and animal organisms as well as isolated cells. The most extensively studied animals have been the mammals. In this regard, the mouse has been investigated most exhaustively, but valuable data has resulted from work upon rabbits, rats, guinea pigs, and other mammals. These animals are employed because, like man, they are complex multicellular vertebrates which belong in the same class--Mammalia. Except in certain rare instances, it is not possible to devise controlled experiments or measure the biological effects of radiation on man. Laboratory mammals, as well as many invertebrate species, have provided this information.

The unit of radiation is the roentgen (r), just as the ohm is the unit for measuring electrical resistance. The amount of damage by radiation is proportional to the ionizations as measured in r absorbed by the cells or tissues of the organism. High-energy radiations such as those produced by modern generators yield and dissipate their energy in cells by ionization excitation. If the dosage, r, is sufficiently great over a given period of time, all cells or organisms may be killed at the end of the exposure. This is the case in radiation from an atom bomb when victims are too close to the target area.

It is known that the dosages required to kill all organisms of a given species vary considerably. The sublethal dosages of radiation employed in research upon organisms cause retardation of division of cells, or their destruction or injury in some--but not all-- of the specimens over a specific period of time. The result may be seen in minutes, hours, days, weeks, or longer, depending on the organism used and the frequency and amount of radiation. It is also known that certain organisms will be destroyed by the same dosage which allows others of their strain to survive. This variation in sensitivity to x-ray holds for genetically pure strains. Because it is so difficult to obtain a definite, consistent end point at which all organisms in a population are killed at a given dosage, it is more accurate and convenient to determine that dosage which is lethal to one-half of the organisms being irradiated within a given period of time. In biological parlance, such a median or mean lethal dose is termed the LD50. For mammals, this period is usually 30 days.

The estimate has been made that the LD50 for man is 400-500 r when the irradiation is received over the entire body within a fairly short period of time. In other words, if a group of 100 persons were irradiated with this dosage, 50 would succumb within 30 days, and 50 would recover, but not necessarily at the same rate. Fortunately, more information is accumulating on the biological effects of lower dosages in man. Some authorities believe that exposure to radiation in amounts as low as 35 r or less will necessitate medical attention.

Despite the vast number of studies which have been reported on the biological effects of radiation, very few have used the one-celled organisms--specifically the structurally complex, ciliated animals such as Paramecium. This is surprising in view of the tremendous advantages they offer as a biological tool. Specimens of paramecia can be collected in nature and are also easily cultivated in the laboratory. From a single specimen, as many as 3 or more generations a day of a rich, genetically pure, pedigreed culture containing enormous numbers of paramecia, can be obtained. For detailed microscopic observations, specimens may be easily and quickly removed from the source of radiation and examined. This permits a degree of speed and precision of observation that is generally impossible with other test animals. Multiplying asexually by binary fission--one cell or animal dividing directly into two without leaving a parental corpse--the organisms are hereditarily alike. This insures uniformity in test animals and controls. Furthermore, long-continued experiments may be performed upon the same race of such pedigreed animals.

The maintenance of cultures of paramedia is economical of space, cost, and time. Although consisting of only a single cell, Paramecium is an entire organism performing in an amazingly efficient manner the same vital activities of nutrition, excretion, irritability, et cetera, which are fundamental attributes of living protoplasm. Unlike tissue cells, which are predominantly specialized for fairly well defined physiologic functions such as secretion, contraction, et cetera, structural complexities in Paramecium are due to intracellular specializations. It is difficult to conceive of the organism as being merely a single cell. Its high degree of sensitivity to the action of drugs, dyes, and many other reagents reaffirms the conviction that the life manifestations of a living organism are capable of an infinitely more sensitive reaction than any of the most perfected chemical reagents. Cells such as Paramecium are actually more critically responsive than some of the most sensitive electrical measuring instruments.

Paramecia are able to survive exceedingly high dosages of roentgen rays; it is worthy of note that these animals, with an LD50 of 340,000 r at 24 hours, have a radiation resistance approximately 850 times as great as that of man and some common vertebrate animals. With low, sublethal dosages, paramecia become perceptibly accelerated in locomotion. Dosages of 200,000 r and above, significantly retard motility and there are generally no survivors above 600,000 r. Irradiation markedly increases the viscosity of the protoplasm; larger dosages lead to irreversible coagulation. As with other cells, irradiation of paramecia temporarily inhibits division; the greater the dosage, the greater the delay, provided death does not result. However, if paramecia survive exposure to radiation, the multiplication rate ordinarily increases slowly until it is normal.

By the adoption of new irradiation techniques, the action of various substances on paramecia can be tested accurately and easily during the

irradiation process. Some of these substances may give protection against radioactivity. Results may have direct practical application to chemicals useful as prophylactics for radiation injury.

An obvious plan that comes to mind is the utilization of these microorganisms to study the biological effects of radiations other than X radiations. Since many unicellular organisms can survive great dosages of X radiation, they may be used advantageously as biological indicators in experiments dealing with atom, hydrogen, or newer types of bombs in which large amounts of energy are released. Since the biological effects of high-dosage radiation on these structurally complex Paramecium cells are known, it is a simple matter to relate and interpolate the comparable radiation damage caused by nuclear energy.

In general, 30 days are required to obtain information on survival of the commonly used laboratory mammals. The same data may be obtained on hundreds of specimens of paramecia within 24 hours. Even more remarkable is the fact that the protoplasm of these one-celled animals can take such tremendous amounts of radiation. It is reasonable to assume that much more can be learned from these tiny organisms in the field of radiation research. (Research Reviews, ONR, Oct., 1954; R. Wichterman, Professor of Biology, Temple University, Philadelphia)

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Plasmacytosis of Bone Marrow

In recent years an increased percentage of plasma cells in the bone marrow and other tissues of the body has been noted in many diseases other than the primary malignant plasmacytic diseases (multiple myeloma, diffuse plasma cell myelosis, and plasma cell leukemia). This condition has been termed plasmacytosis. Plasmacytosis may be considered of clinical importance for two reasons: (1) It requires differentiation from malignant plasmacytic disease. (2) Its diagnostic and clinical significance requires appraisal. In this study a review is made of experiences with 50 cases of plasmacytosis of the bone marrow during the past 6 years.

Differentiation of benign plasmacytosis from malignant plasmacytic disease may be difficult. An increased percentage of plasma cells in the bone marrow, at least in levels up to 20%, can no longer be considered by itself diagnostic of multiple myeloma. The triad of plasmacytosis, hyperglobulinemia, and cryoglobulinemia is also found in benign plasmacytic proliferations. Plasmablasts and proplasmacytes may be seen in both conditions, although usually the percentage in multiple myeloma is greater. The mature plasma cells in multiple myeloma may be indistinguishable from those in normal bone marrow. The entire clinical picture must be taken into account before a decision can be made as to whether a

given case belongs in the category of multiple myeloma or benign plasmacytosis. The absence of bone lesions and the presence of a primary disease to which the plasmacytosis may be secondary are very helpful diagnostically. However, there are pitfalls, because disseminated malignant neoplasms and granulomas may be associated with both bone lesions and plasmacytosis.

Plasmacytosis has been described usually in isolated reports in a wide variety of conditions, including serum sickness, agranulocytosis and aplastic anemia, hypersensitivity to sulfonamides, collagen diseases, rheumatic fever, rheumatoid arthritis, tuberculosis, granuloma inguinale, lymphogranuloma inguinale, Boeck's sarcoid, trichinosis, chronic osteomyelitis, acute infections, including measles and roseola infantum, streptococcal pharyngitis, cirrhosis of the liver, lymphomas and leukemia, and carcinoma.

The variety of recorded clinical conditions, as well as the cases reported associated with plasmacytosis, may be divided into five main groups: (1) sensitivity to drugs or certain antigens, (2) collagen diseases, (3)infections, predominantly chronic and frequently of granulomatous type, (4) cirrhosis of the liver, and (5) disseminated malignant neoplasms.

The experimental literature has indicated that plasmacytosis and hyperglobulinemia may be produced by the hyperimmune state. Considerable attention has been given to the possibility that cells of the plasmacytic type may be associated with the production of antibody globulins. Both in the literature and in the series under discussion there are some cases of plasmacytosis associated either with a definite sensitivity to a chemical, or with the so-called hypersensitive state. Instances of plasmacytosis in "collagen" disease and chronic infection are suspected of having a basis in hypersensitivity. Only in the groups associated with cirrhosis of the liver and disseminated malignant neoplasms is there no clear relation to hypersensitivity. (Arch. Int. Med., Sept., 1954; H. Clark, M. D., and E. E. Muirhead, M. D., Dallas, Texas)

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Proplasmocytes and Atypical Cells in Lymphocytic Meningitis

In the differentiation of tuberculous meningitis from other forms of lymphocytic meningitis, difficulty may arise when tubercle bacilli are not initially found in films of cerebrospinal fluid deposit, and this is accentuated when a low CSF sugar is found. The clinical history is often of no help. Because the early diagnosis is important for appropriate therapy

any additional diagnostic help that the laboratory can give in these difficult cases will be valuable.

The blood films from two proved cases of lymphocytic choriomeningitis, initially diagnosed as tuberculous meningitis because of low C. S. F. sugars and suspicious chest signs, showed the conspicuous presence of large atypical plasma cells. The possibility that these cells might be a characteristic finding in lymphocytic choriomeningitis was considered, and patients admitted to hospital with a lympnocytic meningitis had their blood films carefully examined on the day of admission. The blood and C. S. F. findings of 10 patients suffering from a benign, nontuberculous lymphocytic meningitis were then compared with 12 cases of proved tuberculous meningitis admitted during the same period. The blood films from 9 of the 10 patients with benign meningitis showed large atypical plasma cells. Repeated search for the presence of these cells in the blood films from the patient with tuberculous meningitis was always negative.

It is well known that plasma cells and atypical plasma cells appear in the blood in various infections and irritations of the bone marrow. A survey of the rate of occurrence of these cells in various diseases was made, to find if they occurred predominantly in virus diseases. This appeared to be the case, but they were also found occasionally in nonvirus diseases, e. g., bacterial pneumonia, erysipelas, bronchitis, whooping cough, and urinary infections.

Although the 10 cases of benign meningitis have been grouped together as a disease entity because of the similar clinical and laboratory findings, they were in fact a heterogeneous group. Only 4 of the 10 patients showed a positive, or rising serum titre for the lymphocytic choriomeningitis virus.

The atypical cell is a mononuclear cell whose nucleus is at least twice the diameter of the average red blood cell in the film. The nucleus is usually spherical, rarely elliptical, and nucleoli are uncommon. The nuclear chromatin is in large clumps, showing clear spaces in between sharply demarcated chromatin masses which may be coarse or fine. The cell has an abundant, slaty blue, foamy cytoplasm often showing vacuolation. There is often a halo of lighter colored cytoplasm in the zone surrounding the nucleus. The cell usually exceeds 15 microns in diameter.

This cell is illustrated among typical plasma cells and irritation cells by Pappenheim; it appears identical with the proplasmocytes and atypical plasma cells illustrated by Sandoz; and the nuclear features correspond to Type II Downey cells.

In patients where a provisional diagnosis of tuberculous meningitis is made there is often a temptation to start a course of intrathecal streptomycin without waiting for a report of tubercle bacilli in the C. S. F. For example, Jamieson, in reviewing streptomycin and para-amino salicylic acid treatment of 35 cases of tuberculous meningitis, recorded 5

patients who received treatment without tubercle bacilli being found in the C. S. F. on direct examination. Three of these patients also gave negative cultures, and tubercle bacilli were never isolated throughout the period of observation.

The possibility, therefore, exists that patients with a nontuberculous, lymphocytic type of meningitis accompanied by a low C. S. F. sugar level are treated and recorded as cases of tuberculous meningitis. In excluding this error the comparison of the blood picture is significant.

Although the number of cases studied is small, it appears justifiable to draw attention to the frequent occurrence of atypical plasma cells in peripheral blood in benign nonbacterial lymphocytic meningitis, and the absence of these cells in tuberculous meningitis. The atypical cells can be readily picked up under the low power of the microscope, especially when immersion oil is smeared over the slide so that a blood film may very quickly be searched completely. The fact that these cells are not specific for lymphocytic choriomeningitis or for virus diseases, does not detract from their significance in helping to exclude a diagnosis of tuberculous meningitis. (Blood, Oct., 1954; P. Wolf, M. D., Crumpsall Hospital, Manchester, England)

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C-Reactive Protein and Rheumatic Activity

In sera of patients acutely ill with pneumococcal pneumonia, Tillett and Francis described the presence of a substance which formed a precipitate with a dilute solution of the somatic polysaccharide isolated from the body of the pneumococcus. This reaction was also observed in the sera of patients acutely ill with rheumatic fever, subacute bacterial endocarditis, and lung abscess. Ash reported the presence of this abnormal reaction in sera of children during the acute phase of infections caused by the colon-typhoid group of bacilli. This substance was not found in the sera of patients with chorea, tuberculosis, congenital syphilis, measles, or in patients with rheumatic heart disease without active rheumatic infection. Lofström demonstrated the presence of this substance in a variety of infectious and noninfectious diseases. Included in the latter group were patients with myocardial infarction and fever, and patients who had received injections of sulfur-containing material.

In recent years, several groups of investigators have reported the value of the C-reactive protein determination in acute rheumatic fever. It is generally agreed that the test is of no specific diagnostic value and cannot be used in differentiating rheumatic fever from other febrile illnesses which present similar clinical pictures. However, it seems to be a sensitive index of the presence of rheumatic activity. With rare exception

it has been found in the sera of patients in the acute stage of rheumatic fever. This protein disappears from the blood with subsidence of activity, in most instances, before there is a fall in the erythrocyte sedimentation rate. It reappears, along with the results of other abnormal laboratory tests, after withdrawal of ACTH or cortisone therapy.

This report deals with observations made on 24 patients hospitalized in the rheumatic fever wards of the Jewish Sanitarium and Hospital for Chronic Diseases. These patients were children, adolescents, and adults, admitted early in the acute phase of the rheumatic infection, as well as those transferred from other institutions during convalescence or chronic activity. All but 1 patient had active rheumatic fever. Eleven were males and 13 were females. Two patients had chorea and carditis; 18 were treated with cortisone; 1 received ACTH and 1 hydrocortisone; the remaining 4 received salicylate therapy.

The patients were followed by the same group of pediatricians and cardiologists. X-ray, fluoroscopy of the heart, and electrocardiograms were done frequently at the onset of the disease and on an average of once a month during convalescence. The white blood cell count, erythrocyte sedimentation rate, and plasma fibrinogen were done at least once a week. The cephalin-cholesterol flocculation, zinc turbidity, thymol turbidity, and gamma globulin precipitation tests were also done once a week. In this study, the absence of activity was judged by the complete and persistent subsidence of all clinical and laboratory manifestations of the disease.

Because of the limited amount of C-reactive protein antiserum available, the test was not performed at frequent intervals; instead, tests were done at strategic points in the clinical course. The C-reactive protein determinations were performed according to the method of Anderson and McCarty. Briefly, 1.5 cm. each of the patient's serum and C-reactive protein antiserum were drawn into a capillary tube (external diameter about 1mm.) and incubated for 2 hours at 37°C. The degree of precipitation (0 to 4-plus) was read after over-night refrigeration. One-millimeter precipitation was considered 1-plus.

Of 10 patients with active disease whose sera were tested for C-reactive protein before hormone therapy, all but 1 had amounts varying from 1-plus to 3-plus. Another patient had a 2-plus precipitation shortly after admission, but when the test was repeated 14 days later it was negative despite rheumatic activity.

It is generally accepted that there is no single laboratory procedure which is specific for the diagnosis of rheumatic fever, or for the determination of activity once the diagnosis has been established. The determination of the C-reactive protein has been proposed as the most useful indicator of rheumatic activity. In the series of patients discussed, a negative C-reactive protein determination was by far superior to the sedimentation rate

which usually remained abnormal for 1 to 8 weeks after the C-reactive protein had become negative.

A negative C-reactive protein test was used by the authors as a guide in ambulating, clinically inactive patients in the presence of a persistently elevated erythrocyte sedimentation rate. Whenever possible, the test was repeated a week or two after the patient had been out of bed. If the test remained negative, the patient was discharged from the hospital. Follow-up of these patients has not shown any progression of the disease.

The blood sedimentation rate, fibrinogen, gamma globulin, and the C-reactive protein tests return to normal with cortisone therapy and reappear as part of the laboratory-rebound phenomenon. None of these tests can, therefore, be used in the differential diagnosis of rebound from continued rheumatic activity. Only clinical observation for a period of at least 3 weeks without reinstitution of therapy, can differentiate between the two. Eight of the 12 patients in the series who had a reappearance of a positive C-reactive protein after therapy, proved on clinical observation to have continued rheumatic activity which subsequently subsided spontaneously.

Reports in the literature have indicated that patients with Sydenham's chorea fail to show C-reactive protein in their sera at any stage of the disease. The presence of the C-reactive protein in the sera of the 2 patients with chorea suggests that a positive test in chorea may be indicative of an associated carditis. (Am. Heart J., Oct., 1954; N. H. Shackman, M. D., E. T. Heffer, M. D., and I. G. Kroop, M. D., The Jewish Sanitarium and Hospital for Chronic Diseases, Brooklyn, N. Y.)

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Prevention of Systemic Arterial Embolism

This report presents experience with the use of long-term Dicumarol therapy as prophylaxis against recurrent systemic arterial embolism in patients with chronic rheumatic valvular disease who refused, or were rejected, for mitral valve surgery. This experience, combined with previous observations, led the authors to hold the following points of view concerning the use of long-term Dicumarol therapy in patients with rheumatic mitral valvular disease:

1. Absolute protection against embolism is not necessarily to be expected. Insurance against dislodgment of preformed mural thrombi cannot be provided. It is difficult, if not impossible, to maintain a therapeutically effective prothrombin time in all patients at all times.

2. Because of the close individual attention required for safe anticoagulant administration, and the fact that many patients with mitral stenosis

and auricular fibrillation do not experience clinically apparent embolism, Dicumarol therapy was limited to those persons with preceding embolic manifestations. Possibly a subgroup of these patients who (a) are in the older age range, (b) have a severe degree of mitral stenosis, or (c) have a congestive failure, might be selected as suitable for long-term treatment. Further study of this problem seems indicated.

3. Because of the danger of local hemorrhage, it is probably good judgment to avoid using anticoagulants immediately following a cerebral embolism.

4. Dicumarol should not be administered to ambulatory patients in the absence of adequate laboratory and clinical control. The latter demands alertness of the physician as well as cooperation on the part of the patient. Careful education of the patient concerning the purpose and toxicity of Dicumarol is important. It makes practicable, for the average clinic outpatient, an anticoagulant program where the period between laboratory checks is fixed on what must be conceded to be an arbitrary basis. Unpredictable variations in the effect of Dicumarol are not entirely eliminated by weekly prothrombin time determinations.

5. Provided the requirements of point No. 4 are met, serious hemorrhage rarely should occur although occasional hemorrhagic manifestations are to be anticipated. These can generally be readily controlled with vitamin K which is superior to water-soluble analogs.

6. Once instituted, unless the basic situation is altered, as by mitral commissurotomy, there is no way of selecting a point of safe withdrawal. Therefore, therapy probably should be continued indefinitely in most patients. Although not substantiated, the possibility exists that a temporary state of relative hypercoagulability may follow withdrawal of anticoagulants.

7. Recognizing the foregoing limitations, protracted Dicumarol therapy appears to be a reasonably effective means of preventing recurrent embolism.

In the use of Dicumarol on an outpatient basis, the authors have been inclined to err in the direction of inadequate prolongation of the prothrombin time to reduce the risk of hemorrhage. Some reassurance in this policy has been gained through favorable results by the authors, and the empiric observations of others that protection appears to be afforded with less prothrombin suppression than the generally accepted range of 10 or 15% to 30%. (Circulation, Oct., 1954; J.C. Wood, M.D., and H.L. Conn Jr., M.D., E.B. Robinette Foundation, Medical Clinic, Hospital of the University of Pennsylvania, Philadelphia)

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Simple Spontaneous Pneumothorax

One hundred and fifteen cases of simple spontaneous pneumothorax are reported, ranging in age from 15 to 64 years. Nearly one half occurred between the ages of 20 and 24 years. Eighty-five percent of the entire group were males. The condition occurred on the left side only in 64 patients, in the right side only in 42, and bilaterally in 9.

In 78 cases, initial symptoms were severe, consisting mainly of pain and dyspnea. In the remainder the onset was gradual. Activities of the individuals, when attacks occurred, varied from strenuous work to sound sleep. Physical signs and x-ray inspection were employed in diagnosis, but fluroscopy and x-ray films were most valuable. Various degrees of collapse were observed; in 34 cases, collapse was complete.

Approximately one-third of these patients were treated ambulatorially while the remainder received bed rest ranging from a few days to two months. Air was not aspirated except when positive intrapleural pressure developed. Thirty-nine patients had small fluid accumulations which disappeared promptly without aspiration. Only 1 patient presented a large effusion, which was removed. The 9 cases of spontaneous hemopneumothorax were aspirated until all evidence of blood disappeared. Serious tension pneumothorax occurred in only two cases. Air was removed promptly and as long as positive pressure continued to develop.

Among the 115 patients, 41 had tuberculosis as manifested by the tuberculin reaction, but no evidence of clinical disease was found. Two developed clinical tuberculosis 5 years after pneumothorax occurred. Another, who did not react at the time of the initial pneumothorax, developed clinical pulmonary tuberculosis 18 years later.

Contact has been maintained, or has been recently re-established, in 104 of the 115 patients. Four have been observed for 6 months or less. The remaining 100 have been observed from 1 to 29 years. Among the 100 cases, 71 have had no repetition and 17 have had one recurrence, all on the original side except 2. Twelve have had more than one recurrence, ranging from two to many; in five of these, recurrences were on the original side.

Because 29 of this group of 100 traced cases have had one or more recurrences, everyone who has had an initial attack should be advised of the possibility of others, and how to proceed in the event symptoms of tension pneumothorax appear.

The procedure now recommended after two or more attacks consists of surgical closure of the rent, removal of blebs in evidence, and producing slight irritation of the pleural surfaces by gentle sponge friction.

In all initial attacks as well as recurrences, accumulations of fluid, large or small, should be removed if they do not absorb within a few days, in order to avoid deposits of fibrin on the pleural surfaces. In all cases of

spontaneous hemopneumothorax, blood should be removed as often as necessary, transfusions administered when indicated, and ligation of the vessel and closing the rent if copious bleeding persists unduly long.

Apparently, simple spontaneous pneumothorax occurs more frequently than the literature indicates, because all cases are not reported and many persons whose symptoms are mild do not consult physicians. No method has been devised for the prevention of simple spontaneous pneumothorax, but some recurrences can probably be prevented by surgical removal of blebs or by producing symphysis of the pleurae. Persons who have blebs or bullae demonstrated by x-ray inspection, as well as those who have had one or more attacks of simple spontaneous pneumothorax, should avoid high altitudes except in pressurized cabins and where oxygen can be administered, or a needle introduced into the pleural cavity in the event of emergency. (Dis. Chest, Oct., 1954; J. A. Myers, M. D., University of Minnesota, Minneapolis.)

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Apresoline in Toxemias of Pregnancy

The toxemias of pregnancy account for at least 30,000 stillbirths and neonatal deaths every year, and from 10 to 30% of maternal fatalities. Therefore, the management of this group of diseases constitutes one of the major problems confronting the obstetrician during the last trimester of gestation.

Unfortunately, the underlying cause of the toxemias is unknown. Even the basic pathologic changes are not clearly understood, although there is definite evidence that the disease is associated with a type of vascular disorder in which the arterioles are affected. In eclampsia, many vital organs show signs of severe spasm of the arterioles and frequently a precapillary arteriolitis as well. Such changes account for hypertension, thromboses, and hemorrhages in the brain, heart, and adrenals; and the glomerular damage which causes the albuminuria and anuria. In fact, generalized vasoconstriction may be sufficiently acute to cause localized necrosis in any or all organs.

Because hypertension and signs of renal damage are almost universally exhibited by toxemic patients, the authors have employed Apresoline which is an anti-hypertensive agent that also seems to increase renal plasma flow.

Data which summarized 11 cases shows that Apresoline frequently has proved to be a highly satisfactory drug in patients with essential hypertension and in those with pre-eclampsia and eclampsia. All patients exhibited significant falls in either systolic or diastolic pressure. In 9 of the 11 a desirable depression in both systolic and diastolic pressures

occurred. The average maximal fall was 37/33 mm. Hg. In the toxemic group, the average fall was 43/26, whereas in 4 patients with essential hypertension, the average decrease was 29/29. These results are similar to those of Assali and his associates, in that toxemic patients have greater reduction of pressure than do those with pre-existing hypertension. Also, there was a greater effect percentage-wise on the diastolic pressure than on the systolic.

The findings demonstrate the value of orally and intramuscularly administered Apresoline. Rather dramatic clinical responses were noted in 5 patients--almost one-half. At the time of maximal response to Apresoline, the average depression of blood pressure was 50/42 mm. Hg.

Side effects in this series did not constitute a problem because only one patient (started on a dose of 100 mg.) was unable to tolerate Apresoline. Perhaps if this patient had been started on a smaller dose with gradual increase, the drug would have been tolerated in her case also.

Of the 12 infants delivered, 10 were perfectly normal, although 2 were premature. Two were stillborn and weighed only 1500 and 1700 grams.

Because of the relative inadequacy of other methods of treatment, the experience of the authors and others seems to indicate the desirability of an extensive trial of Apresoline in the hypertensive diseases associated with pregnancy. (Am. J. Obst. & Gynec., Oct., 1954; E. R. Chapman, M. D.,* W. E. Strozier, M. D., and R. A. Magee, M. D., Robert B. Green Memorial Hospital, San Antonio, Texas)

* Deceased, January 22, 1954.

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A Method for Controlling Pain of the Face and Jaws Caused by Tic Douloureux

A new method for controlling the chronic recurring face pain of tic douloureux entails the partial or complete destruction of the nerve cells of the Gasserian ganglion by injection of boiling water into this sensitive nerve center from which the pain originates.

The injection is performed in the radiographic room under light pentothal anesthesia with the aid of a Franklin x-ray head stand. By repeated roentgenograms, the foramen ovale at the base of the skull is visualized, and a 3-3/4 inch spinal needle is inserted through it into the ganglion. The needle puncture is made through the skin of the cheek at a point 3 cm. below the malar bone and between the ramus of the mandible and maxilla. At some point between 12 and 17 mm. from the foraminal edge, blood-tinged cerebrospinal fluid is obtained by jugular compression or syringe aspiration, which indicates that the needle has pierced the

arachnoid reflection surrounding the ganglion and sensory root of the fifth cranial nerve, and that it has been properly placed. Then 1-ml. of boiling distilled water is injected. Under light anesthesia, there can be demonstrated by pin-prick an area of diminished sensation of the face corresponding to the well-known anatomic distribution of the ganglion. Additional 1-ml. injections of water produce a more profound loss of face sensation. It is possible to stop the pain without producing a major sensory loss by injection of smaller quantities of water.

Any analgesic effect produced is believed to be permanent, which is desirable because tic douloureux is incurable except by a major intracranial operation or destruction of the ganglion by alcohol. It is improbable that damage to the brain or other cranial nerves will result if no more than 1-ml. of water is injected at any one time, because the water temperature is immediately lowered to a safe level the instant it is diluted by the intracranial cerebrospinal fluid.

This method has always produced a paralysis of the muscles of mastication, which may be detected on careful examination of the masseter and temporal muscles. It is believed that this is temporary and that the motor branch will regenerate.

The method makes possible the relief from the life-long pain of tic douloureux without the hazards of a major operation or of alcohol injection, as has been necessary in the past. Because most of those suffering from this disorder are elderly persons in poor physical condition for an operation, the procedure can be used without the risks inherent in the other standard procedures required for permanent relief.

Fourteen cases of tic douloureux have been successfully relieved of pain by this method, since the first case was treated on October 30, 1953, without a major complication. One case of cancer of the jaw has been relieved of pain by this procedure. (Science, Vol. 120; R. Jaeger, Dept. of Neurosurgery, Jefferson Medical College, Philadelphia)

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From the Note Book

1. During the Spanish-American War, the Bureau of Medicine and Surgery, Navy Department, consisted of: 3 officers, the Surgeon General, the Assistant, and one officer in charge of records and pensions; 4 civilian assistants, a chief clerk, a finance clerk, a statistics clerk, a pensions clerk, and 4 clerks, including a stenographer for the Surgeon General. (Research Div., BuMed)

2. Captain J. J. Sapero, MC USN, Director of the Preventive Medicine Division, represented the Bureau of Medicine and Surgery at a meeting

of the Commission on Parasitic Diseases, Armed Forces Epidemiology Board, in Memphis, Tenn., Nov., 2, 1954. He also represented the Navy at the Third Annual Meeting of the American Society of Tropical Medicine and Hygiene, the 21st Annual Meeting of the American Academy of Tropical Medicine, and the 29th Annual Meeting of the American Society of Parasitologists in Memphis, Nov., 3-6, 1954. (TIO, BuMed)

3. Commander C. L Crawford, MCS USN, assumed command of the Naval School of Hospital Administration, National Naval Medical Center, Bethesda, Md., Oct., 20, 1954. (TIO, BuMed)

4. Members of the District of Columbia Dental Society of Washington, D. C., dedicated their meeting of Oct., 12, 1954 to the Federal Dental Services. The feature of this program was a joint panel discussion, "Full Dentures," by Commander D. P. Dobson, DC USN: Col. M. E. Fowler, USAF DC; Lieut Col E. H. Smith, DC USA; and Dr. L. Weyer, Dental Director, U. S. Public Health Service. (TIO, BuMed)

5. Under contract with the Office of Naval Research, the Woods Hole Oceanographic Institution has developed a device--the Air-Sea Rescue Drift Buoy--to aid in locating survivors of naval aircraft and vessels abandoned at sea. The ASR Drift Buoy transmits automatically-keyed tone modulated signals on a UHF guard channel of 243 Mc. for a period exceeding 60 hours. Equipped with a pneumatic float, the buoy has almost exactly the same rate and direction of drift as a standard USN aircraft raft when normally loaded and retarded by sea anchor. On impact with the water the buoy displays a dye marker and a small incandescent light to assist the pilot to ditch near it. Raftsmen can then locate the buoy and take it in tow. (Research Reviews, Oct., 1954; ONR)

6. The Axostat is a new electrocardiographic instrument which produces any desired number of interpolated leads between the conventional bipolar extremity leads. (Am. Heart J., Oct., 1954; D. A. Brody, M. D., B. P. McKay, and W. E. Romans, B. S.)

7. Six weeks spent in training the right officer or petty officer ashore in the Fire Fighting Instructors Course is one way of providing an improved and more effective fire prevention maintenance and training program. This course acquaints instructor trainees with standard firefighting techniques, proper use of standard Navy firefighting equipment, and standard methods of firefighting instruction so they can serve as competent firefighting instructors either ashore or at sea. (Naval Training Bulletin, Sept., 1954)

8. The indications for surgery in childhood tuberculosis differ from those in adults because of the basically different anatomical lesions produced in primary disease. In the main, excision is only indicated when endobronchial disease results in collapse and fibrosis of the lobe is involved, or in bronchiectasis. (Dis. Chest, Oct., 1954; G. L. Boyd, M. D., and F. R. Wilkinson, M. D.)

9. Benign strictures of the esophagus are common clinical entities. They may be congenital, inflammatory, chemical, traumatic, or surgical in origin. They vary in degree and extent from small superficial webs to extensive fibrous stenosis or complete atresia. They range in duration from recent acute obstruction to years of minimal or moderate disability--often of unknown or forgotten etiology. (J. Thoracic Surg., Oct., 1954; P. H. Hollinger, M. D., K. C. Johnston, M. D., W. J. Potts, M. D., and F. DaCunha, M. D.)

10. Studies of serum concentrations, tolerance, and clinical response in 100 patients treated with intramuscular oxytetracycline are presented in Antibiotics and Chemotherapy, Oct., 1954; W. S. Waddington, M. D., T. B. Smart, M. D. and W. M. M. Kirby, M. D.

11. All patients who have had pulmonary, osseous or other tuberculosis should have periodic urinalyses for pyuria. The search should be kept up for 10 years after the pulmonary infection. (Am. J. Med., Oct., 1954; J. K. Lattimer, M. D. and R. J. Kohen, M. D.)

12. Interstitial cystitis is a chronic inflammation of the bladder, identified pathologically by involvement of the bladder mucosa, the submucosa, and the muscularis. Panmural cystitis is a descriptive synonym. The bladder involvement is patchy in distribution. The involved areas lose their distensibility and linear cracking occurs when the bladder is overdistended. The etiology is unknown. (J. Urol., Oct., 1954; W. J. Baker and E. C. Graf)

13. A study of environmental factors in carcinoma of the cervix, based upon a clinical-statistical study carried out jointly in the United States and India, appears in Am. J. Obst. & Gynec., Oct., 1954; E. L. Wynder, M. D., J. Cornfield, M. D. P. D. Schroff, M. D., and K. R. Doraiswami, M. D.

14. A report discussing the complications of ileostomy developing in a series of 145 patients, appears in Surg., Oct., 1954; A. S. Lyons, M. D. and J. H. Garlock, M. D.

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BUMED INSTRUCTION 6510.4 30 September 1954

From: Chief, Bureau of Medicine and Surgery
To: Stations Having Medical Corps Personnel Regularly Assigned

Subj: Carbon monoxide blood concentration in aviation personnel; determination of

This Instruction informs medical officers aboard naval activities within the continental limits of the United States in the preparation and shipping of blood specimens obtained from aviators and aircrewmen for carbon monoxide determination.

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BUMED NOTICE 6710 1 October 1954

From: Chief, Bureau of Medicine and Surgery
To: All Ships and Stations Having Medical/Dental Personnel Regularly Assigned

Subj: Antibiotics; extension of potency dates

Ref: (a) Medical and Dental Materiel Bulletin (MDMB) Edition No. 46 of 1 September 1954

This Notice provides authority to extend the potency dates of certain antibiotics.

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BUMED INSTRUCTION 6710.11 15 October 1954

From: Chief, Bureau of Medicine and Surgery
To: All Ships and Stations

Subj: Defective medical and dental material; authority for disposition of

Ref: (a) Medical and Dental Materiel Bulletin, Edition No. 46, dtd 1 Sept 1954
(b) Art. 25-21. ManMedDept

This Instruction provides authority for the disposal of material listed in paragraph IV of reference (a) considered to be defective.

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BUMED INSTRUCTION 6820.4A 21 October 1954

From: Chief, Bureau of Medicine and Surgery
To: Ships and Stations Having Medical/Dental Personnel Regularly Assigned

Subj: Medical and dental professional and technical books; procurement of

Ref: (a) OPNAVINST 7100.2 of 6 Jun 1951 (Notal)

This Instruction informs addressees of the procedure to be followed in the procurement of professional and technical medical and dental books.

BuMed Instruction 6820.4 of Dec 1952 is canceled.

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BUMED INSTRUCTION 4442.1A 22 October 1954

From: Chief, Bureau of Medicine and Surgery
To: Ships and Stations Having Medical/Dental Personnel Regularly Assigned

Subj: Levels of supply for medical and dental stores at consumer activities

Ref: (a) Navy Property Redistribution and Disposal Regulation No. 1 (Revised Aug. 1, 1951)

Encl: (1) Authorized Levels of Supply Applicable to Ships Including Hospitals in Hospital Ships
(2) Authorized Levels of Supply Applicable to Continental Naval Hospitals and All Continental Shore Stations
(3) Authorized Levels of Supply Applicable to Extra-Continental Shore Stations and Extra-Continental Hospitals

This Instruction defines the levels of supply for medical and dental materiel for all consumer activities of the Navy and to prescribe the method of determination and disposition of excesses.

BuMed Instructions 4442.1, 6700.4, and 6710.4 are canceled.

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BUMED INSTRUCTION 6470.4 25 October 1954

From: Chief, Bureau of Medicine and Surgery
To: Activities Utilizing the Photodosimetry Program

Subj: Photodosimetry Program, Calibration Curve for Emulsion No. 544; information concerning

Ref: (a) NAVMED P-5005, Photodosimetry Manual
(b) BUMED-74-bmb, M8-1/NN, Ser 5201 ltr dtd 25 June 1952
(c) BUMED NOTICE 6470 of 16 January 1953
(d) BUMED NOTICE 6470 of 15 June 1954

This Instruction furnishes information concerning curve for use with new film emulsion to naval activities utilizing Photodosimetry Program.

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The printing of this publication has been approved by the Director of the Bureau of the Budget, June 23, 1952.

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PREVENTIVE MEDICINE SECTION

Accidents and the Medical Department

What is the Medical Department's role in the prevention of motor vehicle and other accidents involving Service personnel? This is a question that frequently arises in meetings and conferences. The doctor has been hailed for his advances in life-saving measures and in the rehabilitation of those injured in accidents. Still, his skills and knowledge are useless to those killed outright. He is limited in his ability to reduce the days lost from duty and the cost of hospitalization because bones need time to

knit and cuts time to heal. Nor can he patch up all victims to a degree that will prevent the loss of some expensively trained and valuable men from the Service.

Apropos of motor vehicle accidents, a recent article in a popular magazine is thought-provoking. Entitled, You May Not Be Fit to Drive, it recounts the results of investigations into accidents involving servicemen, "nearly all of the young drivers who doze off while in motion are servicemen who, greatly overestimating their physical stamina, try to stretch a 3-day pass into a cross-country trip. What kills and maims so many of them is not 'road hypnosis' as has been suggested, but ordinary fatigue."

How often is liberty granted to a man who has spent the better part of Friday night on watch? What consideration is given to the amount of rest a man has had and to his fitness for an "authorized" 150-to 250-mile automobile trip on a week-end liberty? The serviceman differs from most motorists who take to the road on week ends with their families. He usually takes his trip to reach his family or friends. Plans must be made in advance and the trip taken regardless of weather, sleep, or minor illnesses, because the next opportunity may find him thousands of miles away due to a transfer. Even a short trip back to his base on a Sunday evening may involve 4 to 8 hours of driving on congested highways if the base is located near a large city.

The medical officer has a stake in preventing injuries to servicemen from all accidents--traffic or nontraffic--in which temporary unfitness, either psychological or physical, may be a causative factor. The Preventive Medicine Division believes that the medical officer has a share in the responsibility for reducing the hazards created for the serviceman by the combination of wearying duties and the necessity for his combatting traffic on clogged highways to see family and friends on week ends.

The question is: What can be done to meet this responsibility? This Division would be interested in learning of anything already being done in this direction by Medical Department personnel and in having suggestions as to what further effort the Medical Department can make.

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Communicable Disease Control

Scrub Typhus
(Mite-Borne Typhus, Tsutsugamushi Disease)

The etiology, geographical distribution, transmission, epidemiology, pathology, and clinical features of scrub typhus were discussed in the Preventive Medicine Section of the 15 October 1954 issue of the Medical News

Letter. The discussion of the disease is concluded in this issue with consideration of laboratory findings, differential diagnosis, prognosis, treatment, and prevention. The material was taken from Department of the Army Technical Bulletin Medical 31 of 26 August 1954.

8. Laboratory Findings. a. Hematological. Although there is no specific blood picture in scrub typhus, the leukocyte count usually is either below or within the normal range during the first week. Severe cases with pneumonitis frequently show a leukocytosis up to 12,000 to 15,000 during the second and third weeks. In cases progressing favorably, there is usually a relative and absolute increase in the lymphocytes during the second and third weeks. Severe anemia is rarely observed, but a slight reduction (half million) in erythrocytes is common.

b. Serological. The presence of agglutinins for the Proteus OX-K bacillus can be demonstrated in the sera of about 80% of patients by the end of the second week. With a properly standardized and controlled antigen, a titer of 1:160 may be regarded as significant, although a diagnostic OX-K agglutination test is best interpreted by a rise and fall in titer, since values of less than 1:160 have not uncommonly been observed in scrub typhus. A series of agglutination tests is of far greater value in interpretation than a single titer of 1:160 or over. A negative agglutination test does not exclude scrub typhus because rickettsiae may be recovered from the blood in about 10% of the patients who fail to develop antibodies. Nonspecific rises in titer of OX-K agglutinins are sometimes evoked by other infections, such as relapsing fever. The agglutination titer usually reaches its peak during the third week, begins to decline rapidly in convalescence about the fourth week, and becomes negative several weeks later. Positive complement-fixation tests, using R. tsutsugamushi antigens are of diagnostic value but negative results are not. Strains of R. tsutsugamushi vary in their antigenic composition, and about half the proved scrub typhus patients fail to develop antibodies which fix complement with available antigens.

c. Blood Chemistry. Occasional severely ill patients show evidence of hepatic insufficiency with slight hypoproteinemia, a reduction in fibrinogen content of plasma and some elevation of icterus index. Before specific therapy was introduced, some hypochloremia usually developed late in the illness, probably the result of inadequate salt intake and excessive sweating.

d. Recovery of Rickettsiae. Isolation of the causative rickettsiae from the untreated patient's blood is relatively simple during the first 8 to 10 days of the disease. Furthermore, rickettsemia may be demonstrated as late as 24 hours after specific therapy is instituted. Five ml. of blood are defibrinated in a vaccine bottle by shaking with glass beads, taken promptly to the laboratory, and centrifuged at low speed. The plasma is removed and the sedimented cells are resuspended in an equal volume of normal saline, 0.3 ml. amounts are immediately injected intraperitoneally

into four or six young adult white mice. The infected mice generally die in 10 to 16 days, but certain strains produce a nonfatal disease. The typical gross pathologic changes are: subcutaneous edema and lymphadenopathy, serofibrinous peritoneal and pleural exudate, enlarged spleen, and patchy hemorrhagic pneumonia. Giemsa stained smears of peritoneal scrapings, or of impression smears of the splenic surface contain minute intra and extracellular diplococcal bodies of the casual rickettsiae. The smear should be fixed in methyl alcohol prior to staining. The rickettsiae persist in convalescent mice. Hence, if special studies on recovered strains are indicated, such animals may be shipped to an appropriate medical laboratory.

9. Differential Diagnosis. Scrub typhus is to be differentiated from the other rickettsia diseases--epidemic and murine typhus, and spotted fever--and in the early stage, from such diseases as dengue, sandfly fever, influenza, typhoid fever, malaria, leptospirosis, relapsing fever, epidemic hemorrhagic fever, and infectious hepatitis which may be commonly found in endemic scrub typhus areas. The characteristic primary lesion (eschar) and Weil-Felix reaction (positive OX-K; negative OX-19 and OX-2 agglutinations) serve to separate scrub typhus from the other rickettsial diseases and the infections which are considered in the differential diagnosis. The skin eruption, appearing on the fifth to eighth day, may be of diagnostic value, but, again, similar rashes may be seen in these other diseases. Final diagnosis is confirmed by a diagnostic OX-K agglutinin test. Recovery of the causative rickettsia from the blood by inoculation of white mice, and its identification, proves the diagnosis.

10. Prognosis a. The case fatality rate in American troops in World War II ranged between 0.6 and 35.3%, according to figures available from American and Australian sources. Differences between case fatality rates in various units prior to introduction of specific antibiotic therapy were dependent on a number of variable factors, such as age and physical condition of the patient, stage of the disease when admitted to the hospital, virulence of the strain of R. tsutsugamushi, method of, and time required for, evacuation, and the coexistence of other diseases such as dysentery and malaria. The case fatality rate rises sharply after the age of forty.

b. Although not invariably so, the presence of one of the following signs should serve as a warning; a combination of them indicates a poor prognosis:

(1) Increasing pulse rate, particularly if the rate is out of proportion to the temperature.

(2) Onset of muscular twitching, convulsions, and coma.

(3) Increasing leukocytosis with relative and absolute decrease in lymphocytes.

c. Since the introduction of specific antibiotic therapy, death rarely occurs. Even the neglected, desperately ill patients generally recover when treatment is instituted.

11. Treatment. Chloramphenicol, (chloromycetin), chlortetracycline (aureomycin), and oxytetracycline (terramycin) are specific therapeutic agents for scrub typhus and provide prompt control of the disease. Patients at any stage of the illness are rendered afebrile and essentially asymptomatic within 24 to 48 hours after treatment is instituted. The choice of these three antibiotics is in the order named above, and is dependent primarily on the amount of mild toxic side effects elicited by the drugs since all three are effective in alleviating the disease. None of these three antibiotics is rickettsiacidal but each elicits its effect by suppressing growth of the organism. Ultimate recovery depends on the development of immunity by the patient. Penicillin and sulfonamides are of no value in scrub typhus. While previously used to control secondary bacterial infection, they are no longer needed since chloramphenicol, chlortetracycline and oxytetracycline are antibacterial as well as antirickettsial in their action.

a. Schedule. Chloramphenicol, chlortetracycline, or oxytetracycline are each given orally by the same schedule, which consists of a leading dose of 3.0 gm. followed by 0.5 gm every 6 hours until the temperature reaches normal. Usually 5.0 gm. over a period of 24 hours are sufficient, but in the more seriously ill patients, treatment may be required for another day or so. In rare instances, oral medication is impossible; here, one of the parenteral forms of the antibiotics may be given.

(1) Treatment of relapses. Because the specific antibiotics are only rickettsiostatic, and because their suppressive effect, when given in the short course prescribed above, lasts approximately a week, certain patients treated early in their disease will lose the drug effect before immunity develops about the 14th day. Relapses occur in approximately three quarters of those given antibiotic therapy on the second day of illness in about half of those treated on the fourth to sixth day, and in practically none treated on the seventh day or later. Relapses respond promptly to another course of 3.0 to 5.0 gm. of antibiotic, and can be prevented in those persons treated early in the first week of illness by a supplementary 3.0 gm. oral dose of antibiotic 6 days after the end of the first course. Continuous therapy up to the 14th day after onset of disease is unwarranted; supplemental treatment is indicated only in those whose disease was aborted early in its first week.

(2) Contraindications. There are no ordinary contraindications to the use of these highly specific antibiotics in the treatment of this serious disease. A leukopenia as low as 2000 is occasionally encountered as a manifestation of scrub typhus and does not preclude use of the drugs.

(3) Toxic side reactions. Mild gastrointestinal disturbances, nausea, vomiting, and diarrhea often result from the therapeutic regimens prescribed above. These are least frequent with chloramphenicol and most frequent with oxytetracycline. These manifestations are rarely severe

enough to require discontinuation of the antibiotic, with the exception of oxytetracycline. Serious blood dyscrasias may result from the use of chloramphenicol, chlortetracycline, or oxytetracycline. However, this uncommon complication should not prohibit their use if the physician exercises proper precautions and judgment.

b. Supportive Treatment. Since the advent of the specific antibiotics, recovery is so prompt that the general supportive measures no longer retain their former importance in the treatment of scrub typhus. However, good nursing and medical care are always indicated. When the temperature returns to normal, appetite reappears and a full diet should not be delayed too long.

c. Convalescence. The period of convalescent care should be based on the duration and severity of the disease. Patients treated within the first week generally can be discharged from the hospital by the 21st day after onset. Full recovery to normal physical and mental vigor may be delayed for several months; hence, sedentary or light duties should be assigned during this period.

12. Prevention. Vaccines for use in immunization of personnel against scrub typhus have not proven satisfactory. Therefore, use must be made of other measures to prevent, or reduce to a minimum, contact between susceptible individuals and vector mites. Certain of these measures must be carried out at the organizational level, while others may be employed by the individual.

a. Organizational Protective Measures.

(1) Clothing. In areas where scrub typhus is endemic, it is essential that clothing be treated with a miticidal or repellent chemical. All troops whose activities bring them into contact with ground that might harbor infected arthropods should also have their blankets or sleeping bag covers impregnated with the repellent fluid. Clothing treatment repellents which provide protection against a variety of arthropods are available through supply channels. Impregnation may be accomplished by hand dipping of clothing by units in the field, or by machine impregnation in fixed or mobile laundry units. Dilution rates vary with method of impregnation and for cotton or wool clothing. Detailed instructions for impregnation should be obtained from the surgeon of the command and should be followed explicitly. Treated uniforms should not be worn until they are thoroughly dry, and untreated underwear should be worn to prevent skin irritation. Prolonged or excessive contact with repellent, particularly the concentrate, should be avoided during impregnation. Plastics, such as watch crystals, fountain pens, and pocket combs may be affected by contact with treated clothing or repellent.

(2) Preparation of Camp Sites. Locations which are to be used as new camp sites should be prepared as fully as possible before the arrival of occupying units. A bulldozer should be used if available.

All vegetation should be cut level with the ground and burned or hauled away. Trombiculid mites, known to be vectors, live only in damp shaded soil, and any procedure which exposes the ground to the drying effect of sunlight will be helpful. After a thorough clearing the ground usually dries sufficiently in two or three weeks to kill the mites. Personnel employed in clearing operations must exercise particular precautions and use protective measures.

(3) Use of Insecticides. Under special conditions, strategic areas where large bodies of troops must operate for a period of time, may be treated with some of the newer insecticides in order to kill the trombiculid mite vectors. These insecticides have a residual effect, which will vary from place to place and which has not yet been fully determined in all instances. The residual effect ordinarily lasts for one month or more. These chemicals are toxic and are to be used only by trained personnel.

(a) Dieldrin. Dieldrin concentrates should be handled only by personnel equipped with respirators and waterproof xylene-resistant gloves. Breathing of dieldrin fumes, dusts, or sprays, should be avoided. Contaminated skin areas should be washed immediately with soap and water. Clothing that can be easily removed and thoroughly laundered, should be worn during application of insecticide and should be removed promptly when contaminated. Add one part of 18% emulsifiable concentrate (QM Stock No. 51-1-165) (Navy Stock No. G 51-1-157-1625) to 29 parts of water (4.5 ounces per gallon of water). This makes a 0.6% dieldrin spray. Apply to ground litter and low vegetation at a rate of 10 to 20 gallons per acre, depending on the amount of vegetation and litter. The 50% water dispersible powder (QM Stock No. 51-1-165-50) is equally effective, using 1.5 ounces per gallon of water.

(b) Lindane (gamma isomer of benzene hexachloride). The acute toxicity of lindane concentrates from ingestion, inhalation, or skin absorption requires the same precautions as those outlined in paragraph (a) above, when applied as an outdoor residual. Add one part of the 20% emulsion concentrate (QM Stock No. 51-1-167-5) (Navy Stock No. G51-1-167-133) to 49 parts of water (2.6 ounces per gallon of water). Apply spray to ground litter and low vegetation at a rate of 10 to 20 gallons per acre, depending on the amount of vegetation. The 75% water dispersible powder (QM Stock No. 51-1-167-75) is equally effective, using 2/3 ounce of insecticide per gallon of water.

(c) DDT. DDT is of relatively little value as a residual insecticide applied to the ground to control mites, and should not be used as a substitute for the above compounds.

(4) Rodenticides. Rodenticides must be considered important weapons in the control of scrub typhus inasmuch as rodents and possibly other small mammals serve as reservoirs of this disease. The rodenticide Warfarin and, under special circumstances, "1080" (sodium monofluoroacetate) may be used to exterminate rodents on and near camp sites.

These compounds are to be administered only by specially trained personnel. It is important that these measures be coupled with the use of clothing impregnant and other anti-mite procedures. Otherwise, rodent control measures alone may expose troops to hordes of chiggers, mites, and fleas deprived of their normal rodent hosts but still living in the camp area.

b. Individual Measures. Personnel exposed in scrub typhus areas should treat exposed portions of the skin with insect repellent specially designed for the purpose (QM Stock No. 51-R-270). The repellent may be put on the arms and legs prior to entrance into such areas. Reapplication may be necessary every 4 to 8 hours. Individuals may impregnate their clothing with this repellent by spraying it on uniforms by means of an insectized sprayer (hand or knapsack-type pressure sprayer). Ordinarily 2-1/2 ounces per uniform is required to give protection. Special effort should be made to thoroughly wet the socks, shoe tops and fly, trouser leg cuffs, trouser fly, waist band, and front fly and cuffs of the shirt. Individual treatment of uniforms by this means is not as satisfactory as complete impregnation by the methods referred to above.

Precautions: Care should be taken to avoid applying insect repellent to mucous membranes, and similarly sensitive parts of the body. The spraying of the uniform does not protect the exposed skin. These insect repellents are solvents for some paints and plastics. Do not apply repellents designed for clothing impregnation directly to the skin.

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Industrial Medicine

Hazards Involved in Foamglas Installation

Several potential hazards are involved during the proposed installation of Foamglas block insulation aboard ship. The blocks will be cut to size on a table circular saw in a land-based shop. During this operation, hydrogen sulphide gas, formed as a by-product during its manufacture and sealed in the cellular structure, will be liberated into the atmosphere.

Resin Silicone XR-807, manufactured by Dow Corning Company, will be used as a primer for coating Foamglas block insulation. This silicone resin by weight is 50% a mixture of Xylene and Solvesso 100. Xylene and Solvesso may be used as a thinner also for the silicone resin and for cleaning brushes and paint spray equipment used in conjunction with this process.

It is proposed that the following health precautions be observed: (1) Employees sawing Foamglas should wear respirators equipped with acid gas cartridges. (2) Painters spraying silicone resin onto Foamglas blocks, Fiberglas boards, and saran-coated vapor barrier cloth should wear airline respirators. (3) Protective gloves should be worn to avoid skin contact

with silicone resin primer and mixture, and with Xylene and Solvesso thinners. Hands and other skin surfaces should not be cleaned with these thinners. (4) Smoking or other ignition sources should be prohibited. (5) Chemical cartridge respirators and/or exhaust ventilation should be used to prevent breathing of solvent vapors. (6) Follow-up checks should be made by the Medical Department when installation of Foamglas in the catapult troughs is begun in order to ensure that adequate health precautions are being taken. (Industrial Health Report, New York Naval Shipyard, April 1954)

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Change of Address

Please forward requests for change of address for the News Letter to: Commanding Officer, U. S. Naval Medical School, National Naval Medical Center, Bethesda 14, Md., giving full name, rank, corps, and old and new addresses.

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